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U.S. To Install Indian Ocean Tsunami-Detection Buoy in December

Second DART buoy to be deployed in 2007 as part of U.S. contribution to system

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A Deep-ocean Assessment and Reporting of Tsunamis (DART) buoy is deployed in the Pacific Ocean. [file photo] (NOAA)

This article is the first of a two-part series about the U.S. contribution to the Indian Ocean tsunami warning system.

Washington – The U.S. National Oceanic and Atmospheric Administration (NOAA) will deploy the first of two deep-ocean monitoring buoys in the Indian Ocean in December, located to give many of the region's 27 coastal nations warning of an impending tsunami.

A second deep-ocean assessment and reporting of tsunamis (DART) buoy will be added in another central Indian Ocean location in April 2007.

The DART buoys are the first two of an array of 15 to 28 buoys designed as one part of a complete Indian Ocean early warning system by Eddie Bernard, director of the NOAA Pacific Marine Environmental Laboratory in Seattle.

The array, approved at the first meeting of the UNESCO Intergovernmental Oceanographic Commission (IOC) coordination group for the Indian Ocean tsunami warning system in Australia in August 2005, was based on a study of tsunamis in the region from 1700 to the present. (See related article.)

The two buoys are part of the United States' two-year, $16.6 million contribution of money and expertise to help develop an integrated early warning and mitigation system for tsunamis and other coastal hazards in the Indian Ocean.

NOAA is partnering with the governments of Thailand and Indonesia to maintain the DART buoys once they are deployed.

"This will be a major milestone," said Curt Barrett, director of the Indian Ocean Project at NOAA, "because we're pulling out all the stops to make sure that when the system goes in, it's operational, functioning and end-to-end – meaning that data from the buoy gets to a satellite and onto the Global Telecommunications System [GTS] that links all 27 Indian Ocean countries."

The GTS is a global network for transmitting meteorological data from

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An end-to-end system begins with hazard detection and forecasting, using equipment like DART buoys and tide gauges.

Next, experts evaluate the threat and issue alerts to each affected region or country. Then experts in those areas decide whether the threat warrants alerting the public, using sirens, e-mail, cell phone messages and other methods.

Finally, in communities that are prepared for such warnings, escape routes are marked clearly and people know how best to respond to save lives and property.

End-to-end schematic diagram of the Indian Ocean tsunami warning system. (IOTWS)

"The end-to-end idea is critical," Barrett added. "Buoys are of no value unless that information reaches the people who have to make decisions about whether or not to evacuate."

On July 17, the failure of a tsunami warning to reach those who needed it cost 650 lives. At 3:19 p.m. that day, a 7.7-magnitude earthquake occurred 240 kilometers off the southern coast of Java, Indonesia, sending a two-meter-high tsunami into the resort town of Pangadaran and nearby areas.

Within 15 minutes, NOAA's Pacific Tsunami Warning Center (PTWC) in Hawaii had issued a tsunami bulletin about the earthquake and possible local tsunamis in Australia and Indonesia. A second PTWC bulletin said sea-level gauge data indicated that a tsunami was generated and that news media had reported a damaging local tsunami. The Japanese Meteorological Agency also issued tsunami bulletins.

Indonesian officials received the information but had not yet installed a warning system on the beaches of Java, the most populous of the country's thousands of islands, so they could not alert sunbathers and people in local hotels, restaurants and homes.

"Siren towers are an important part of an end-to-end system," said Walter Mooney, a seismologist with the U.S. Geological Survey (USGS), "and the Indonesian government has proposed to build them."

BUILDING CAPACITY

Mooney and Barrett are two of many scientists and experts from NOAA, USGS and other U.S. agencies who are working in Indonesia, Thailand, India, Sri Lanka and the Maldives to build national and local capacity in all the areas related to an end-to-end tsunami warning system.

Mooney was in Jakarta May 10-17 with other USGS scientists to train 48 Indonesian geophysicists in seismology basics and give them hands-on experience operating seismic stations. In all, 50 to 60 seismic stations now are being installed throughout the country by Indonesia, the United States, Germany, Japan and China.

"Indonesia is a long extended country," Mooney said, "and almost all of it has tsunami risk, so the stations are spread out over 4,500 kilometers. Roughly speaking, there's a seismometer every 100 kilometers, spaced out along the islands. It should be enough."

A regional USGS training session, August 22-25, will teach people from Indonesia, Thailand, Sri Lanka and Malaysia about seismology and seismic stations and encourage the sharing of data and information in a regional context, Mooney said.

Other scientists are teaching people in the region about paleotsunami studies – the ancient history of tsunamis in the region. A USGS team traveled to Indonesia and Thailand in July to help establish past patterns of tsunami inundation and calculate future risk.

"What you really want to know is what the future might hold," Mooney said. "One way to do that is to look at the geological evidence for past tsunamis – how big they were and how often they occurred."

For additional information, see the related article in this series.

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